IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Barsness *et al.*	Docket No.:	ROC920030327US1
Serial No.:	10/733,752	Group Art Unit:	2163
Filed:	12/11/2003	Examiner:	Le, Michael

For: DATABASE RANGE CONSTRAINT THAT IS DYNAMICALLY LIMITED
BY DATA IN THE DATABASE

APPEAL BRIEF

Mail Stop APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

This appeal is taken from the Examiner's final rejection, set forth in the Office
Action dated 05/18/2007, and affirmed in the Advisory Action dated 07/23/2007, of
appellant's claims 1-29, 32-38, 41-43 and 46-47. Appellant's Notice of Appeal under 37
C.F.R. § 1.191 was filed on 08/18/2007.

REAL PARTY IN INTEREST

International Business Machines Corporation is the Real Party in Interest.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences for this patent application.

1

STATUS OF CLAIMS

Claims 1-47 were originally filed in this patent application. In response to the first office action dated 11/21/2006, an amendment was filed on 02/20/2007 that cancelled claims 30-31, 39-40 and 44-45 and amended claims 1, 6-10, 12-14, 16, 25, 29, 36, 38, 41, 43 and 46. In response to the final action dated 05/18/2007, a Request for Reconsideration was filed on 07/14/2007, but no claims were cancelled or amended. In the pending final office action dated 05/18/2007, claims 1-5, 8, 10-12, 14-29, 32-35, 37-38, 42-32 and 47 were rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter. Claims 1-6, 8-9, 11-13, 15-24, 29, 32-36, 38, 41, 43 and 46 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,680,614 to Bakuya et al. (hereinafter "Bakuya") in view of U.S. Patent Application Publication 2003/0084025 to Zuzarte. Claims 7, 10, 14, 25-28, 37, 42 and 47 were rejected under 35 U.S.C. §103(a) as being unpatentable over Bakuya in view of Zuzarte and further in view of U.S. Patent No. 6,463,429 to Geppert *et al.* (hereinafter "Geppert"). No claim was allowed. In the advisory action dated 07/23/2007, the examiner withdrew the rejection of claims 1-5, 8, 10-12, 14-29, 32-35, 37-38, 42-32 and 47 under 35 U.S.C. §101, but maintained the other rejections of the claims. The claims remaining in the case are claims 1-29, 32-38, 41-43 and 46-47, all of which stand finally rejected. No claim has been allowed. Claims 1-29, 32-38, 41-43 and 46-47 are at issue in this appeal.

STATUS OF AMENDMENTS

The amendment filed on 02/20/2007 has been entered. Therefore, the claims at issue in this appeal are the claims as amended by the amendment filed 02/20/2007, namely claims 1-29, 32-38, 41-43 and 46-47.

2

SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1 recites an apparatus comprising at least one processor (FIG. 1, 110; p. 5 line 12); a memory coupled to the at least one processor (FIG. 1, 120; p. 5 lines 12-13); a database residing in the memory (FIG. 1, 123; p. 5 line 20); a range constraint defined for the database, the range constraint including at least one limit that is dynamically determined from data in the database (FIG. 1, 127; p. 6 lines 7-13); and a database manager residing in the memory and executed by the at least one processor (FIG. 1, 125; p. 6 lines 4-5), wherein the range constraint defines a range that includes the at least one limit (FIG. 1, 127; p. 6 lines 9-11), and wherein the database manager allows entry of data into the database when the data lies within the range (FIG. 11, 1130=YES and 1140; p. 11 lines 15-16).

Claim 8 recites an apparatus comprising at least one processor (FIG. 1, 110; p. 5 line 12); a memory coupled to the at least one processor (FIG. 1, 120; p. 5 lines 12-13); a database table residing in the memory, the database table including at least one column (FIG. 1, 124; FIG. 2, Table T; p. 6 lines 1-2); a range constraint defined for a selected column in the database table (FIG. 1, 127; p. 6 lines 7-13), the range constraint defining a range that includes at least one limit that is dynamically determined from data in the selected column (FIG. 1, 127; p. 9 lines 23-25); and a database manager residing in the memory and executed by the at least one processor (FIG. 1, 125; p. 6 lines 4-5), the database manager allowing entry of data into the selected column when the data lies within the defined range (FIG. 11, 1130=YES and 1140; p. 11 lines 15-16).

Claim 12 recites an apparatus comprising at least one processor (FIG. 1, 110; p. 5 line 12); a memory coupled to the at least one processor (FIG. 1, 120; p. 5 lines 12-13); a database table residing in the memory, the database table including at least one column (FIG. 1, 124; FIG. 2, Table T; p. 6 lines 1-2); a range constraint defined for a selected column in the database table (FIG. 1, 127; p. 6 lines 7-13), the range constraint defining a

range that includes at least one limit that is dynamically determined from data in a column that is different than the selected column (FIG. 1, 127; p. 9 line 25 to p. 10 line 2); and a database manager residing in the memory and executed by the at least one processor (FIG. 1, 125; p. 6 lines 4-5), the database manager allowing entry of data into the selected column when the data lies within the defined range (FIG. 11, 1130=YES and 1140; p. 11 lines 15-16).

Claim 16 recites a computer-implemented method for entering data in a database, the method comprising the steps of (A) defining a range constraint for a selected portion of the database (FIG. 1, 127; p. 6 lines 7-13); (B) defining at least one limit for the range constraint that is dynamically determined from data in the database (FIG. 1, 127; p. 6 lines 7-13); and (C) allowing entry of data into the selected portion of the database when the data lies within a range defined by the range constraint (FIG. 11, 1130=YES and 1140; p. 11 lines 15-16).

Claim 21 recites a computer-implemented method for limiting data entry into a selected column in a database table, the method comprising the steps of (A) defining a range constraint for the selected column (FIG. 1, 127; p. 6 lines 7-13), the range constraint defining a range that includes at least one limit that is dynamically determined from data in the database table (FIG. 1, 127; p. 9 lines 23-25); and (B) allowing entry of data into the selected column only when the data to be entered lies within the defined range (FIG. 11, 1130=YES and 1140; p. 11 lines 15-16).

Claim 25 recites a computer-implemented method for entering data into a selected column in a database table, the method comprising the steps of (A) defining a range constraint for the selected column (FIG. 1, 127; p. 6 lines 7-13), the range constraint defining a range that includes at least one limit that is dynamically determined from data in the database table FIG. 1, 127; p. 9 lines 23-25); and (B) if the data to be entered lies outside of the defined range (FIG. 11, 1130=NO; p. 11 lines 16-19), allowing entry of

4

data into the selected column (FIG. 11, 1150=YES and 1170; p. 11 lines 20-22), and in response thereto, providing a warning message (FIG. 11, 1180; p. 11 lines 20-22).

Claim 29 recites a computer-readable program product comprising (A) a database manager (FIG. 1, 125; p. 6 lines 4-5) that allows defining a range constraint for a database, the range constraint including at least one limit that is dynamically determined from data in the database (FIG. 1, 127; p. 6 lines 7-13), the database manager allowing entry of data into the database when the data lies within a range defined by the range constraint (FIG. 11, 1130=YES and 1140; p. 11 lines 15-16); and (B) computer-readable recordable media bearing the database manager (FIG. 1, 195; p. 8 lines 10-15).

Claim 38 recites a computer-readable program product comprising (A) a database manager that allows defining a range constraint for a selected column in a database table (FIG. 1, 125 and 127; p. 6 lines 7-13), the range constraint defining a range that includes at least one limit that is dynamically determined from data in the selected column (FIG. 1, 127; p. 9 lines 23-25), the database manager allowing entry of data into the selected column when the data lies within the defined range (FIG. 11, 1130=YES and 1140; p. 11 lines 15-16); and (B) computer-readable recordable media bearing the database manager (FIG. 1, 195; p. 8 lines 10-15).

Claim 43 recites a computer-readable program product comprising (A) a database manager that allows defining a range constraint for a selected column in a database table (FIG. 1, 125 and 127; p. 6 lines 7-13), the range constraint defining a range that includes at least one limit that is dynamically determined from data in a column that is different than the selected column (FIG. 1, 127; p. 9 line 25 to p. 10 line 2), the database manager allowing entry of data into the selected column when the data lies within the defined range (FIG. 11, 1130=YES and 1140; p. 11 lines 15-16); and (B) computer-readable recordable media bearing the database manager (FIG. 1, 195; p. 8 lines 10-15).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following grounds of rejection are presented for review on this Appeal:

1. Whether claims 1-6, 8-9, 11-13, 15-24, 29, 32-36, 38, 41, 43 and 46 are unpatentable under 35 U.S.C. §103(a) as being obvious in view of Bakuya and Zuzarte.

2. Whether claims 7, 10, 14, 25-28, 37, 42 and 47 are unpatentable under 35 U.S.C. §103(a) as being unpatentable over Bakuya in view of Zuzarte and further in view Geppert.

ARGUMENT

Issue 1:   **Whether claims 1-6, 8-9, 11-13, 15-24, 29, 32-36, 38, 41, 43 and 46 are unpatentable under 35 U.S.C. §103(a) as being obvious in view of Bakuya and Zuzarte.**

The examiner rejected claims 1-6, 8, 9, 11-13, 15-24, 29, 32-36, 38, 41, 43, and 46 under 35 U.S.C. §103(a) as being unpatentable over Bakuya in view of Zuzarte. Each of these claims is addressed below.

Claims 1-2, 8, 16-17, 29, 32 and 38

Claim 1 recites:

> An apparatus comprising:
> at least one processor;
> a memory coupled to the at least one processor;
> a database residing in the memory;
> a range constraint defined for the database, the range constraint including at least one limit that is dynamically determined from data in the database; and
> a database manager residing in the memory and executed by the at least one processor, wherein the range constraint defines a range that includes the at least one limit, and wherein the database manager allows entry of data into the database when the data lies within the range.

The examiner admits Bakuya does not disclose "…at least one limit that is dynamically determined from data in the database…" and claims that Zuzarte does teach "…at least one limit that is dynamically determined from data in the database…" The examiner states:

> Zuzarte discloses selecting a column or generating a virtual column and performing a statistical analysis on the particular column regarding information such as high and low values. From the statistical information,

7

Zuzarte discloses creating constraints that reflect the statistical characteristic of the particular column (Zuzarte: para. 0020, lines 6-12).

Paragraph 0020 lines 6-12 states:

Statistical information regarding a virtual column can be generated just as for an actual column. For example, statistical information can be gathered regarding the high and low values, the cardinality, the frequency of values and histogram statistics.

The rest of the paragraph 0020 cited by the examiner states:

Statistical constraints can then be used by the query optimizer to assist in estimating cardinalities. If the optimizer is evaluating a query plan that involves a predicate like C1-C2=10 or C1-C2>=30, the statistical information gathered from the virtual column can be exploited by the RDBMS to generate temporary statistical constraints for use in estimating cardinality.

Zuzarte does teach statistical constraints, but the statistical constraints as taught by Zuzarte are for the express purpose of estimating cardinality, which may they be used to optimize a query. The statistical constraints in Zuzarte are not used to limit the data that may be entered into a database column. The statistical constraints in Zuzarte have nothing to do with range constraints or other integrity constraints. In fact, Zuzarte expressly states that the statistical constraints are different from ordinary integrity constraints at paragraph 0021 lines 1-3.

In the Advisory Action, the examiner states:

Paragraph 0021 of Zuzarte does state that statistical constraints are different from ordinary constraints, but it also states that the specific difference is "that they are not necessarily valid for all of the data." Zuzarte at para. 0021, lines 1-3. Therefore, the distinction between them is not so great that statistical constraints cannot be used for data integrity purposes.

8

By the examiner's own admission, the statistical constraints in Zuzarte are not necessarily valid for all of the data. This means that data in a column for which statistical constraints are defined in Zuzarte may not satisfy the statistical constraints. This fact alone is fatal to the examiner's rejection, because it means the statistical constraints are not used as range constraints to limit what data may be entered into the database. If this were the case, the statistical constraints in Zuzarte would be traditional integrity constraints.

Paragraph 0007 of Zuzarte at lines 4-13 states:

> An integrity constraint (also called a business rule) describes a condition about the database that must be true. It is a declarative statement that the relational database management system must ensure remains true. When an update operation is performed, the relational database management system checks the integrity constraints to ensure the operation will not violate an integrity constraint. An example of an integrity constraint, in the case of a database containing educational test scores, could be that the test score cannot be less than zero or greater than one hundred.

The integrity constraint referenced above in Zuzarte must always remain true, and the RDBMS checks the integrity constraints to ensure all update operations will not violate an integrity constraint. The sample integrity constraint for a test score column in a database table being between zero and one hundred is an example of a common range constraint with fixed limits, similar to that shown in FIG. 3 and as discussed in detail in appellant's specification. Zuzarte goes on to state in paragraph 0008 that imposing integrity constraints can be costly. Zuzarte then states in paragraph 0009:

> Accordingly, it would be advantageous to have a method of creating and maintaining statistical expressions that contain statistical information on relationships between columns in a database and assist in query optimization *without requiring that the expressions remain true or be evaluated with each update to the database.*

The entire goal and purpose of Zuzarte is to create a new type of constraint which is termed a statistical soft constraint that does not require that the expressions remain true or

9

be evaluated with each update to the database. In claim 1, in contrast, the database manager allows entry of data into the database when the data lies within the range that includes at least one limit dynamically determined from data in the database. Because the statistical soft constraints in Zuzarte do not require that their expressions remain true or be evaluated with each update to the database, they do not cause the database manager to allow entry of data into the database when the data lies within the range that includes at least one limit dynamically determined from data in the database. In fact, the statistical soft constraints are not used in any way by the database manager in Zuzarte to allow entry of data into the database when the data lies within the range. Thus, despite the examiner's attempt to minimize the difference between integrity constraints and the statistical soft constraints disclosed in Zuzarte, the plain language of Zuzarte teaches the statistical soft constraints cannot be used for data integrity purposes because they are not always true and are not evaluated with each update to the database. For these reasons, Zuzarte does not teach the range constraint recited in claim 1.

Furthermore, a reasonable combination of the teachings of Bakuya and Zuzarte do not lead to the conclusion drawn by the examiner. Even if a person of ordinary skill in the art had both references in front of them, it would not have been obvious to combine their teachings in the way suggested by the examiner.

In the rejection the examiner states:

> At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the apparatus of Bakuya by adding the feature of at least one limit that is dynamically determined from data in the database, as taught by Zuzarte.

The statistical constraints in Zuzarte have nothing to do with range constraints. As a result, it would not have been obvious to combine Bakuya and Zuzarte as suggested by the examiner.

10

Appellant respectfully asserts the examiner's stated motivation to combine Bakuya and Zuzarte is defective. The examiner states:

> The motivation for doing so would have been because constraining the values of a column to a particular range allows for database queries to be optimized (Zuzarte: para. 0003).

Zuzarte teaches computing statistical constraints to estimate cardinality, which may then be used in optimizing a query. Zuzarte is devoid of any teaching regarding constraining values of a column to a particular range, as stated in the examiner's motivation to combine Bakuya and Zuzarte. Furthermore, the examiner's statement that constraining values of a column to a particular range allows for database queries to be optimized is incorrect, and is not taught anywhere in Zuzarte. Because Zuzarte does not teach or suggest that constraining values of a column to a particular range allows for database queries to be optimized, the examiner's rationale for combining Bakuya and Zuzarte is in error.

In the Advisory Action, the examiner apparently recognized that the motivation to combine Bakuya and Zuzarte in the final office action was defective, and attempted to shift rationale for the combination, stating:

> One of ordinary skill in the art wanting to have table constraints with the added advantage of optimizing queries would have been motivated by the [sic] Zuzarte and therefore would have combined Zuzarte with Bakuya.

The examiner's attempt to shift to a new motivation to combine in the Advisory Action is ineffective. For one reason, the examiner cannot present for the first time in the Advisory Action a new motivation to combine the references. The original motivation to combine in the final office action is defective, as apparently recognized by the examiner's shift to a new and different motivation to combine in the Advisory Action. Because the examiner's motivation to combine Bakuya and Zuzarte in the final office action is defective, the examiner's rejection based on the combination of Bakuya and Zuzarte is in error.

11

Even if the examiner is allowed to shift to a new motivation to combine in the Advisory Action, this does not help the examiner's case. The examiner's new motivation to combine in the Advisory Action is that one of ordinary skill in the art wanting to have table constraints with the added advantage of optimizing queries would have been motivated by Zuzarte and therefore would have combined Zuzarte with Bakuya. This language essentially admits that Zuzarte has nothing to do with range constraints, because one of ordinary skill in the art would have to want both table constraints as taught in Bakuya and optimizing queries in Zuzarte to arrive at the combination. However, one skilled in the art would recognize that integrity constraints and query optimization have nothing to do with each other. Integrity constraints are always enforced by the database manager each time an update is performed. Query optimization is done when a query is executed. One could easily combine Bakuya and Zuzarte to arrive at a system that includes the fixed range constraints in Bakuya and the query optimization as taught in Zuzarte without the huge logical jump to replacing a fixed limit on a range constraint taught in Bakuya with something that's not a limit for an integrity constraint but is dynamically determined from the database as taught in Zuzarte. The only possible motivation for combining Bakuya and Zuzarte as suggested by the examiner is based on impermissible hindsight reconstruction. There is no motivation in either reference or in general knowledge in the art to combine these two references in the manner suggested by the examiner. For the many reasons given above, the combination of Bakuya and Zuzarte is improper.

In the Advisory Action, the examiner states:

> Applicant argues that since Zuzarte discloses statistical constraints for estimating cardinality, it would not have been obvious to one of ordinary skill in the art to combine Zuzarte with Bakuya, which discloses range constraints with fixed limits (Remarks at 17.) The Examiner respectfully disagrees. Although Zuzarte discloses the use of statistical constraints for estimating cardinality, Zuzarte discloses that the statistical constraints are calculated based upon high and low values of a column (Zuzarte at para. 0020, lines 6-12) and that the statistical constraints are like ordinary

integrity constraints (range constraints) except for "an extra piece of information." Zuzarte at para. 0021, lines 4-6. Thus, contrary to Applicant's assertion, the statistical constraints of Zuzarte are very much like integrity constraints (range constraints). Bakuya discloses fixed range table constraints as acknowledged by Applicant. Since Zuzarte discloses statistical constraints, which are very much like ordinary integrity constraints except that they are dynamically determined from values of a column, one of ordinary skill in the art would have been motivated to combine Zuzarte with Bakuya by replacing the fixed range constraints of Bakuya with the statistical constraints of Zuzarte.

The examiner's characterization of Zuzarte is incorrect. The examiner's statement that the statistical constraints in Zuzarte are like ordinary integrity constraints (range constraints) except for "an extra piece of information" is incorrect. In fact, the cited paragraph 0021 at lines 4-6 states: "In addition, SSCs include an extra piece of information along with the expression expected in an ordinary integrity constraint." The language "In addition" at the beginning of this sentence is a statement that the difference articulated in lines 1-3 is not the only difference between the statistical soft constraints and known integrity constraints. The difference in lines 1-3 is that statistical constraints are not necessarily valid for all of the data. This difference is discussed in detail above. Because integrity constraints must always be true, and are always enforced by the database manager when an update operation is performed, the differences between the statistical soft constraints taught in Zuzarte and integrity constraints are not minimal, as suggested by the examiner, but are monumental and would prevent one of ordinary skill in the art at the time the invention was made from combining Bakuya and Zuzarte as suggested by the examiner.

Another problem with the examiner's language quoted above is how the examiner so cavalierly extends the teachings of Zuzarte beyond the realm of estimating cardinality. The entire reason for generating statistical soft constraints (SSCs) in Zuzarte is to estimate cardinality. The estimation of cardinality is referenced in the Title; in the Abstract; in the Field of the Invention at paragraph

13

0001; in the Background of the Invention at paragraphs 0002, 0003, 0004, 0005, 0006 and 0009; in the Brief Summary of the Invention at paragraphs 0010, 0011 and 0012; in the Brief Description of the Drawings at paragraph 0015; in the Detailed Description of the Preferred Embodiments at paragraphs 0016, 0019, 0020, 0022, 0023, 0024, 0025, 0027, 0028, 0029, 0034, 0035 and 0037; and in the Claims at claims 1-10, 16-21 and 23. This shows overwhelmingly that the use of the SSCs in Zuzarte is only disclosed in Zuzarte for the estimation of cardinality during query optimization. The estimation of cardinality during query optimization has nothing to do with integrity constraints that limit data being inserted into the database. One of ordinary skill in the art would not be motivated to combine Bakuya and Zuzarte as suggested by the examiner because Zuzarte does not teach a constraint with a limit that is dynamically determined from data in the database that is checked by the database manager, which allows entry of data into the database when the data lies within the range.

Bakuya teaches a range constraint with fixed limits. Zuzarte teaches statistical constraints for computing cardinality, which may then be used to optimize queries. Appellant strenuously asserts that one of ordinary skill in the art would not be motivated based on the teachings of Zuzarte to modify the range constraint of Bakuya to include one or more limits that are dynamically determined from data in the database as recited in claim 1. As a result the examiner's combination of Bakuya and Zuzarte is in error.

It is also not logical to make the leap from estimating cardinality in Zuzarte to constraining values in a column in Bakuya. The constraints taught by Bakuya and Zuzarte are completely different in their usage and function, and neither Bakuya nor Zuzarte suggest combining the two to achieve a "…range constraint including at least one limit that is dynamically determined from data in the database…" as recited in claim 1. The only motivation to combine Bakuya and Zuzarte is by the knowledge the examiner

has gleaned from Appellant's disclosure, which amounts to impermissible hindsight reconstruction. In fact, one could combine the Bakuya and Zuzarte inventions and arrive at a system that includes both without including the claimed invention because the inventions in Bakuya and Zuzarte are separate and distinct from one another, and neither suggests the combination suggested by the examiner. For these reasons, claim 1 is allowable over the combination of Bakuya and Zuzarte.

Claims 8, 16, 29 and 38 include limitations similar to those discussed in claim 1 above, and are therefore allowable for the same reasons.

Each of claims 2, 17 and 32 depend on an independent claim that is allowable for the reasons given above. As a result, claims 2, 17 and 32 are allowable as depending on allowable independent claims. Appellant respectfully requests the examiner's rejection of claims 1-2, 8, 16-17, 29, 32 and 38 under 35 U.S.C. §103(a) be reversed.

Claims 3, 18 and 33

The arguments with respect to claim 1 apply equally to claims 3, 18 and 33, and are incorporated herein by reference. In rejecting claim 3, the examiner cites Zuzarte para. 0020, lines 6-12. This cited language in Zuzarte states the statistical constraints reflect "a characteristic of the virtual column." The statistical constraints in Zuzarte are then used to estimate cardinality. Specific examples of statistical constraints in Zuzarte are disclosed in para. 0021: C1-C2=10 [40%]; C1-C2>10 AND C1-C2<=20 [10%]. These statistical constraints in Zuzarte do not correspond to limits for an integrity constraint (such as a range constraint recited in the claims), and one of ordinary skill in the art would not be motivated to provide at least one limit for a range constraint that is dynamically determined from data in the selected column, as expressly recited in claim 3. For this reason, claim 3 is allowable over the combination of Bakuya and Zuzarte. In addition, claim 3 depends on claim 2, which is allowable for the reasons given above. As a result, claim 3 is also allowable as depending on an allowable independent claim.

Claims 18 and 33 include limitations similar to claim 3 discussed above, and are therefore allowable for the same reasons. In addition, claim 18 depends on claim 17, which is allowable for the reasons given above. Claim 33 depends on claim 32, which depends on claim 29, which is allowable for the reasons given above. As a result, claims 18 and 33 are also allowable as depending on allowable independent claims. Appellant respectfully requests the examiner's rejection of claims 3, 18 and 33 under 35 U.S.C. §103(a) be reversed.

Claims 4, 12, 19, 34 and 43

The arguments with respect to claims 1 and 3 apply equally to claims 4, 12, 19, 34 and 43, and are incorporated herein by reference. In rejecting claim 4, the examiner cites Zuzarte para. 0020, lines 2-4 and 6-12. This cited language in Zuzarte states the statistical constraints reflect "a characteristic of the virtual column." The statistical constraints in Zuzarte are then used to estimate cardinality. Specific examples of statistical constraints in Zuzarte are disclosed in para. 0021: $C1-C2=10$ [40%]; $C1-C2>10$ AND $C1-C2<=20$ [10%]. These statistical constraints in Zuzarte do not correspond to limits for an integrity constraint (such as a range constraint recited in the claims), and one of ordinary skill in the art would not be motivated to provide at least one limit for a range constraint that is dynamically determined from data in a column that is different than the selected column, as expressly recited in claim 4. For this reason, claim 4 is allowable over the combination of Bakuya and Zuzarte. In addition, claim 4 depends on claim 2, which is allowable for the reasons given above. As a result, claim 4 is also allowable as depending on an allowable independent claim.

Claims 12, 19, 34 and 43 include limitations similar to claim 4 discussed above, and are therefore allowable for the same reasons. In addition, claim 19 depends on claim 17, which is allowable for the reasons given above. Claim 34 depends on claim 32, which depends on claim 29, which is allowable for the reasons given above. As a result, claims 19 and 34 are also allowable as depending on allowable independent claims.

Appellant respectfully requests the examiner's rejection of claims 4, 19, 34 and 43 under 35 U.S.C. §103(a) be reversed.

Claims 5, 11, 15, 20 and 35

The arguments with respect to claim 1 applies equally to claims 5, 11, 20 and 35, and are incorporated herein by reference. In rejecting claim 5, the examiner cites Zuzarte para. 0020, lines 6-12. This cited language in Zuzarte states the statistical constraints reflect "a characteristic of the virtual column." The statistical constraints in Zuzarte are then used to estimate cardinality. Specific examples of statistical constraints in Zuzarte are disclosed in para. 0021: C1-C2=10 [40%]; C1-C2>10 AND C1-C2<=20 [10%]. These statistical constraints in Zuzarte do not correspond to limits for an integrity constraint (such as a range constraint recited in the claims), and one of ordinary skill in the art would not be motivated to provide at least one limit for a range constraint that is dynamically determined by performing statistical analysis on data in the database, as expressly recited in claim 5. For this reason, claim 5 is allowable over the combination of Bakuya and Zuzarte. In addition, claim 5 depends on claim 1, which is allowable for the reasons given above. As a result, claim 5 is also allowable as depending on an allowable independent claim.

Claims 11, 20 and 35 include limitations similar to claim 5 discussed above, and are therefore allowable for the same reasons. In addition, claim 11 depends on claim 8, which is allowable for the reasons given above. Claim 15 depends on claim 12, which is allowable for the reasons given above. Claim 20 depends on claim 16, which is allowable for the reasons given above. Claim 35 depends on claim 29, which is allowable for the reasons given above. As a result, claims 11, 20 and 35 are also allowable as depending on allowable independent claims. Appellant respectfully requests the examiner's rejection of claims 5, 11, 20 and 35 under 35 U.S.C. §103(a) be reversed.

Claims 6, 9, 13, 36 and 41

In rejecting claim 6, the examiner cites to Bakuya at col. 9 lines 36-40, which teaches fixed limits on known range constraints. As discussed in great detail above with respect to claim 1, the statistical soft constraints in Zuzarte do not require that all the data meet the constraint. As a result, one of ordinary skill in the art would not be motivated to combine the statistical soft constraint as taught in Zuzarte as a limit for a range constraint as taught in Bakuya. For these reasons, claim 6 is allowable over the combination of Bakuya and Zuzarte.

Claims 9, 13, 36 and 41 include limitations similar to claim 6 discussed above, and are therefore allowable for the same reasons. In addition, claim 9 depends on claim 8, which is allowable for the reasons given above. Claim 13 depends on claim 12, which is allowable for the reasons given above. Claim 36 depends on claim 29, which is allowable for the reasons given above. Claim 41 depends on claim 38, which is allowable for the reasons given above. As a result, claims 9, 36 and 41 are also allowable as depending on allowable independent claims. Appellant respectfully requests the examiner's rejection of claims 6, 9, 36 and 41 under 35 U.S.C. §103(a) be reversed.

Claim 21

The arguments with respect to claim 1 are applicable to claim 21, and are incorporated herein by reference. Claim 21 recites "(B) allowing entry of data into the selected column only when the data to be entered lies within the defined range." The word "only" in the claims implies that no data will be written to the selected column that does not satisfy the range constraint. This expressly teaches away from the statistical soft constraint in Zuzarte, which expressly discloses that not all data in the column needs to satisfy the statistical soft constraint. As a result, it would not have been obvious to use the statistical soft constraint in Zuzarte as a limit for a range constraint as taught in Bakuya. The examiner's rejection of claim 21 is therefore in error. Appellant

respectfully requests the examiner's rejection of claim 21 under 35 U.S.C. §103(a) be reversed.

Claim 22

The arguments with respect to claim 3 are applicable to claim 22, and are incorporated herein by reference. Claim 22 includes limitations similar to those in claim 3 above, and is therefore allowable for the same reasons. In addition, claim 22 depends on claim 21, which is allowable for the reasons given above. As a result, claim 22 is also allowable as depending on an allowable independent claim. Appellant respectfully requests the examiner's rejection of claim 22 under 35 U.S.C. §103(a) be reversed.

Claim 23

The arguments with respect to claim 4 are applicable to claim 23, and are incorporated herein by reference. Claim 23 includes limitations similar to those in claim 4 above, and is therefore allowable for the same reasons. In addition, claim 23 depends on claim 21, which is allowable for the reasons given above. As a result, claim 23 is also allowable as depending on an allowable independent claim. Appellant respectfully requests the examiner's rejection of claim 23 under 35 U.S.C. §103(a) be reversed.

Claim 24

The arguments with respect to claim 5 are applicable to claim 24, and are incorporated herein by reference. Claim 24 includes limitations similar to those in claim 5 above, and is therefore allowable for the same reasons. In addition, claim 24 depends on claim 21, which is allowable for the reasons given above. As a result, claim 24 is also allowable as depending on an allowable independent claim. Appellant respectfully requests the examiner's rejection of claim 24 under 35 U.S.C. §103(a) be reversed.

Claim 46

The arguments with respect to claim 6 are applicable to claim 46, and are incorporated herein by reference. Claim 46 includes limitations similar to those in claim 6 above, and is therefore allowable for the same reasons. In addition, claim 46 depends on claim 43, which is allowable for the reasons given above. As a result, claim 46 is also allowable as depending on an allowable independent claim. Appellant respectfully requests the examiner's rejection of claim 46 under 35 U.S.C. §103(a) be reversed.

Issue 2: **Whether claims 7, 10, 14, 25-28, 37, 42 and 47 are unpatentable under 35 U.S.C. §103(a) as being unpatentable over Bakuya in view of Zuzarte and further in view Geppert.**

The examiner rejected claims 7, 10, 14, 25-28, 37, 42, and 47 under 35 U.S.C. §103(a) as being unpatentable over Bakuya, in view of Zuzarte, and further in view of Geppert. Each of these claims is addressed below.

Claims 7, 10, 14, 25-28, 37, 42, and 47

The examiner rejected claims 7, 10, 14, 25-28, 37, 42, and 47 under 35 U.S.C. §103(a). In rejecting claim 7, the examiner states Bakuya teaches if the data lies outside the defined range, the database manager provides a warning message, citing col. 9, lines 39-40 of Bakuya. The examiner then admits Bakuya and Zuzarte do not expressly disclose if the data lies outside of the defined range, the database manager allows entry of the data into the database in addition to providing a warning message. The examiner then cites to Geppert as allegedly teaching this limitation at col. 4 lines 47-61, stating:

Geppert further discloses a corrective action when data is outside the range constraint wherein a corrective action is set to be an alert sent to a responsible party (warning), even though the query result is returned to the user (allows entry of data into the database)(Geppert: col. 5, lines 15-10).

The warning in Geppert is given in response to a detected inconsistency between data and a constraint when the inconsistent data is returned to the user. Geppert does not teach the database manager allows entry of the data into the database. The inconsistent data in Geppert is viewed as an error that needs correcting. Geppert does not teach or suggest a database manager that allows entry of data into the database and providing a warning message. To the contrary, Geppert teaches providing a warning message in response to detecting an inconsistency. Nowhere does Geppert teach an inconsistency arises by a database manager allowing entry of data into the database that is outside the defined range of the range constraint as recited in claim 7. For these reasons, claim 7 is allowable over the combination of Bakuya, Zuzarte and Geppert. In addition, claim 7 depends on claim 1, which is allowable for the reasons given above. As a result, claim 7 is also allowable as depending on an allowable independent claim.

Each of claims 10, 14, 25-28, 37, 42, and 47 include limitations similar to those discussed in claim 7 above, and are therefore allowable for the same reasons. In addition, each of claims 10, 14, 26-28, 37, 42 and 47 depend on an independent claim that is allowable for the reasons given above. As a result, each of claims 10, 14, 26-28, 37, 42 and 47 are also allowable as depending on an allowable independent claim. Appellant respectfully requests reconsideration of the examiner's rejection of claims 7, 10, 14, 25-28, 37, 42, and 47 under 35 U.S.C. §103(a).

CONCLUSION

Claims 1-29, 32-38, 41-43 and 46-47 are addressed in this Appeal. For the numerous reasons articulated above, appellant maintains that the rejection of claims 1-29, 32-38, 41-43 and 46-47 under 35 U.S.C. § 103(a) is erroneous.

Appellant respectfully submits that this Appeal Brief fully responds to, and successfully contravenes, every ground of rejection and respectfully requests that the final rejection be reversed and that all claims in the subject patent application be found allowable.

Respectfully submitted,

/derekpmartin/
Derek P. Martin
Reg. No. 36,595

MARTIN & ASSOCIATES, L.L.C.
P.O. Box 548
Carthage, MO 64836-0548
(417) 358-4700
Fax (417) 358-5757

CLAIMS APPENDIX

1. An apparatus comprising:

    at least one processor;

    a memory coupled to the at least one processor;

    a database residing in the memory;

    a range constraint defined for the database, the range constraint including at least one limit that is dynamically determined from data in the database; and

    a database manager residing in the memory and executed by the at least one processor, wherein the range constraint defines a range that includes the at least one limit, and wherein the database manager allows entry of data into the database when the data lies within the range.

2. The apparatus of claim 1 wherein the database comprises at least one database table comprising at least one column, and wherein the range constraint is defined for a selected column.

3. The apparatus of claim 2 wherein the at least one limit is dynamically determined from data in the selected column.

4. The apparatus of claim 2 wherein the at least one limit is dynamically determined from data in a column that is different than the selected column.

5. The apparatus of claim 1 wherein the at least one limit is dynamically determined by performing statistical analysis on data in the database.

6. The apparatus of claim 1 wherein the range constraint defines a range that includes the at least one limit, and wherein the database manager allows entry of data into the database when the data lies within the defined range and does not allow entry of data into the database when the data lies outside the defined range.

7. The apparatus of claim 1 wherein the range constraint defines a range that includes the at least one limit, and wherein:

if the data lies within the defined range, the database manager allows entry of the data into the database; and

if the data lies outside of the defined range, the database manager allows entry of the data into the database and provides a warning message.

8. An apparatus comprising:

    at least one processor;

    a memory coupled to the at least one processor;

    a database table residing in the memory, the database table including at least one column;

    a range constraint defined for a selected column in the database table, the range constraint defining a range that includes at least one limit that is dynamically determined from data in the selected column; and

    a database manager residing in the memory and executed by the at least one processor, the database manager allowing entry of data into the selected column when the data lies within the defined range.

9. The apparatus of claim 8 wherein the database manager allows entry of data into the selected column when the data lies within the defined range and does not allow entry of data into the database when the data lies outside the defined range.

10. The apparatus of claim 8 wherein the database manager allows entry of data into the selected column when the data lies outside the defined range and in response thereto, provides a warning message.

11. The apparatus of claim 8 wherein the at least one limit is dynamically determined by performing statistical analysis on data in the selected column.

12. An apparatus comprising:

    at least one processor;

    a memory coupled to the at least one processor;

    a database table residing in the memory, the database table including at least one column;

    a range constraint defined for a selected column in the database table, the range constraint defining a range that includes at least one limit that is dynamically determined from data in a column that is different than the selected column; and

    a database manager residing in the memory and executed by the at least one processor, the database manager allowing entry of data into the selected column when the data lies within the defined range.

13. The apparatus of claim 12 wherein the database manager allows entry of data into the selected column when the data lies within the defined range and does not allow entry of data into the selected column when the data lies outside the defined range.

14. The apparatus of claim 12 wherein the database manager allows entry of data into the selected column when the data lies outside the defined range and in response thereto, provides a warning message.

15. The apparatus of claim 12 wherein the at least one limit is dynamically determined by performing statistical analysis on data in the different column.

16. A computer-implemented method for entering data in a database, the method comprising the steps of:

(A) defining a range constraint for a selected portion of the database;

(B) defining at least one limit for the range constraint that is dynamically determined from data in the database; and

(C) allowing entry of data into the selected portion of the database when the data lies within a range defined by the range constraint.

17. The method of claim 16 wherein the database comprises at least one table comprising at least one column, and wherein the selected portion comprises a selected column.

18. The method of claim 17 wherein step (B) defines at least one limit that is dynamically determined from data in the selected column.

19. The method of claim 17 wherein step (B) defines at least one limit that is dynamically determined from data in a column that is different than the selected column.

20. The method of claim 16 wherein step (B) defines at least one limit that is dynamically determined by performing statistical analysis on data in the database.

21. A computer-implemented method for limiting data entry into a selected column in a database table, the method comprising the steps of:

    (A) defining a range constraint for the selected column, the range constraint defining a range that includes at least one limit that is dynamically determined from data in the database table; and

    (B) allowing entry of data into the selected column only when the data to be entered lies within the defined range.

22. The method of claim 21 wherein step (A) defines at least one limit that is dynamically determined from data in the selected column.

23. The method of claim 21 wherein step (A) defines at least one limit that is dynamically determined from data in a column that is different than the selected column.

24. The method of claim 21 wherein step (A) defines at least one limit that is dynamically determined by performing statistical analysis on data in the database table.

25. A computer-implemented method for entering data into a selected column in a database table, the method comprising the steps of:

(A) defining a range constraint for the selected column, the range constraint defining a range that includes at least one limit that is dynamically determined from data in the database table; and

(B) if the data to be entered lies outside of the defined range, allowing entry of data into the selected column, and in response thereto, providing a warning message.

26. The method of claim 25 wherein step (A) defines at least one limit that is dynamically determined from data in the selected column.

27. The method of claim 25 wherein step (A) defines at least one limit that is dynamically determined from data in a column that is different than the selected column.

28. The method of claim 25 wherein step (A) defines at least one limit that is dynamically determined by performing statistical analysis on data in the database table.

29. A computer-readable program product comprising:

(A) a database manager that allows defining a range constraint for a database, the range constraint including at least one limit that is dynamically determined from data in the database, the database manager allowing entry of data into the database when the data lies within a range defined by the range constraint; and

(B) computer-readable recordable media bearing the database manager.

30-31 (Cancelled)

32. The program product of claim 29 wherein the database comprises at least one database table comprising at least one column, and wherein the range constraint is defined for a selected column.

33. The program product of claim 32 wherein the at least one limit is dynamically determined from data in the selected column.

34. The program product of claim 32 wherein the at least one limit is dynamically determined from data in a column that is different than the selected column.

35. The program product of claim 29 wherein the at least one limit is dynamically determined by performing statistical analysis on data in the database.

36. The program product of claim 29 wherein the range constraint defines a range that includes the at least one limit, and wherein the database manager allows entry of data into the database when the data lies within the defined range and does not allow entry of data into the database when the data lies outside the defined range.

37. The program product of claim 29 wherein the range constraint defines a range that includes the at least one limit, and wherein the database manager allows entry of data into the database and provides a warning message when the data lies outside the defined range.

38. A computer-readable program product comprising:

    (A) a database manager that allows defining a range constraint for a selected column in a database table, the range constraint defining a range that includes at least one limit that is dynamically determined from data in the selected column, the database manager allowing entry of data into the selected column when the data lies within the defined range; and

    (B) computer-readable recordable media bearing the database manager.

39-40 (Cancelled)

41. The program product of claim 38 wherein the database manager allows entry of data into the selected column when the data lies within the defined range and does not allow entry of data into the database when the data lies outside the defined range.

42. The program product of claim 38 wherein the database manager allows entry of data into the selected column and provides a warning message when the data lies outside the defined range.

43. A computer-readable program product comprising:

(A) a database manager that allows defining a range constraint for a selected column in a database table, the range constraint defining a range that includes at least one limit that is dynamically determined from data in a column that is different than the selected column, the database manager allowing entry of data into the selected column when the data lies within the defined range; and

(B) computer-readable recordable media bearing the database manager.

44-45 (Cancelled)

46. The program product of claim 43 wherein the database manager allows entry of data into the selected column when the data lies within the defined range and does not allow entry of data into the database when the data lies outside the defined range.

47. The program product of claim 43 wherein the database manager allows entry of data into the selected column and provides a warning message when the data lies outside the defined range.

EVIDENCE APPENDIX

An Evidence Appendix is not required for this Appeal Brief.

RELATED PROCEEDINGS APPENDIX

A Related Proceedings Appendix is not required for this Appeal Brief.